

What is claimed is:

Sub B1

1. An optical communication system comprising an external cavity laser that comprises:
 3. ✓ a gain medium comprising an active region, a beam expanding region, ^{more efficient coupling} and an antireflective layer on a first surface of the gain medium;
 5. ✓ an optical waveguide located adjacent the gain medium such that at least a portion of the electromagnetic energy generated by the active region passes through the beam expanding region and through the antireflective layer into the optical waveguide; and
 9. ✓ a Bragg grating integral with or coupled to the optical waveguide, wherein the medium and the optical waveguide exhibit a coupling efficiency of at least 40% with or without the presence of coupling optics located between the gain medium and the optical waveguide, and wherein the laser is configured and operated to provide a multimode output of at least two modes.

Sub C1

1. a 2. The system of claim 1, wherein the coupling efficiency is at least ~~40%~~ ^{50%} with or without the presence of coupling optics located between the gain medium and the optical waveguide.

Sub C2

2. 3. The system of claim 1, wherein the gain medium comprises a cavity less than 1 cm in length.

1. 4. The system of claim 1, wherein the length of the system is less than 100 km.

Sub C3

1. 5. The system of claim 1, wherein the laser is operated by direct modulation.
1. 6. The system of claim 1, wherein the bit error rate of the system is less than 10^{-9} .

1 7. The system of claim 6, wherein the bit error rate of the system is less than
2 10^{-12} .

1 8. The system of claim 1, wherein the laser is operated at 2.5 GHz or greater.

1 9. The system of claim 1, wherein the laser is operated in the absence of a
2 temperature-compensating apparatus.

1 10. The system of claim 1, wherein the gain medium and optical waveguide
2 are coupled in the absence of coupling optics.

sub B3 11. An optical communication system comprising an external cavity laser that
2 comprises:

3 ✓ a gain medium comprising an active region, a beam expanding region,
4 and an antireflective layer on a first surface of the gain medium;

5 ✓ an optical waveguide located adjacent the gain medium such that at
6 least a portion of the electromagnetic energy generated by the active region
7 passes through the beam expanding region and through the antireflective
8 layer into the optical waveguide; and

9 ✓ a Bragg grating integral with or coupled to the optical waveguide,
10 wherein the medium and the optical waveguide exhibit a coupling
11 efficiency of at least 40% in the absence of coupling optics located
12 between the gain medium and the optical waveguide,

13 ✓ wherein the laser is configured and operated to provide a multimode output of at
14 least two modes,

15 ✓ wherein the laser is operated by direct modulation,

16 ✓ wherein the laser is operated in the absence of a temperature-compensating
17 apparatus,

18 ✓ wherein the gain medium comprises a cavity less than 1 cm in length, and

19 ✓ wherein the length of the system is less than 100 km.

Sub A' >

12. The system of claim 11, wherein the coupling efficiency is at least 40%
2 with or without the presence of coupling optics located between the gain medium and the
3 optical waveguide.

Sub C7

2 10^{-9} .

13. The system of claim 11, wherein the bit error rate of the system is less than

1 2 10^{-9} .

14. The system of claim 13, wherein the bit error rate of the system is less than

2 10^{-12} .

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15. The system of claim 13, wherein the laser is operated at 2.5 GHz or greater

*add
B4*